

Chapter 9C10. Focal Taxonomic Collections: Ascidians

Gretchen Lambert, Friday Harbor Laboratories, University of Washington

Results

A total of 12 species of ascidians were collected during this expedition. The highest number of species and of individuals was at Homer, Tatitlek and Cordova, the three locations with the highest salinity. No ascidians were recorded from Seward or Whittier, or the floats at Valdez, where the salinity was only 10-12 parts per thousand, although fouling panels at Valdez, submerged at about 7m, did have some ascidians. Ascidiaceae require at least 25-27 parts per thousand and prefer a salinity of 30 or higher. Three of the 12 species are colonial, the other 9 are solitary forms. Although there were not a large number of species collected, they do represent a good diversity. Both orders and all three suborders of the class Ascidiacea are represented and include a total of 6 families. Seven of the 12 species are known to brood their embryos and release swimming tadpoles; all 7 of these did harbor mature embryos. At the end of this report is a list of the ascidian voucher specimens collected in 1998; there were no additional species to the 1999 collections.

The collection includes an undescribed species of *Distaplia*, a colonial form in the suborder Aplousobranchia. It is surprising that this species is very abundant at both Homer and Cordova marinas, yet has gone unrecognized for nearly a century. It is possible that if Ritter (1901) or Huntsman (1912) collected it, they may have considered it merely a variant of *Distaplia occidentalis*. On the other hand, this species may have been much rarer during Ritter's and Huntsman's time. Its preferred habitat is apparently sheltered surfaces, shallow but never exposed at low tide and away from very much light. It is thus "pre-adapted" for the huge surface area and specialized environment provided by marina floats and the many submerged ropes up to 3m. in length that are often suspended from floats. Before the building of large marinas, this particular type of habitat was not abundant. The marina environment is also somewhat unstable, subject to changing seasonal conditions. Many ascidians are well adapted to take advantage of this instability. *Distaplia* spp., like most aplousobranchs, are very fast growing, reach sexual maturity in a few weeks, reproduce and then die back to a dedifferentiated basal portion that can survive until environmental conditions are again suitable for rapid growth. This new species is somewhat similar to a cold-water form from the Kamchatka Peninsula of Russia, and an analysis and description of it is being prepared in collaboration with Dr. Karen Sanamyan of the Kamchatka Institute of Science.

Two species of the genus *Ascidia* were collected and present a taxonomic problem. One corresponds to *Ascidia adhaerens* Ritter, 1901, the other to *Ascidiopsis columbiana* Huntsman, 1912. (The genus *Ascidiopsis* is no longer valid; it was synonymized under the genus *Ascidia*.) Van Name (1945) synonymized these two NE Pacific species under *Ascidia callosa*, probably incorrectly; *A. callosa* was described in 1852 by Stimpson from U.S. east coast specimens from Massachusetts. The recent genetic analysis of many Atlantic and Pacific species of various taxa that closely resemble each morphologically and were originally lumped into the same species has resulted in many cases in their separation into different species (R. Strathmann pers. comm.). However, a recent re-examination of Stimpson's syntypes of *Ascidia callosa* and Ritter's paratypes of *Ascidia adhaerens*, borrowed from the Smithsonian National Museum of Natural

History, has confirmed that these are the same species. Thus, *Ascidia adhaerens* remains a synonym under *A. callosa*. The type specimen of Huntsman's *Ascidiopsis columbiana* was borrowed from the Royal Ontario Museum in Toronto. I was able to confirm that this species is indeed distinct from *Ascidia callosa* and thus should be resurrected as a valid species, which will be done in a publication now in preparation.

Botrylloides violaceus is not native to Alaska, or to any part of the NE Pacific. It is a Japanese species that appeared on the U.S. Pacific coast about 20 years ago (J. Carlton pers. comm.). Since that time it has spread and become extremely abundant from southern California to British Columbia (Lambert and Lambert, 1998). This is the first report of its presence in any part of Alaska, however. Although large colonies were not observed, the fouling panels at Tatitlek contained numerous newly settled zooids most of which appeared healthy. Thus somewhere close to the panels there had to be mature colonies which were supplying the short-lived tadpoles that settled on the panels. *B. violaceus* incubates its embryos; the tadpoles that are released are huge, complex, and usually swim for just a very brief period, perhaps only a few minutes, before settling. The unusual tadpole morphology allows for easy recognition of this invasive species (Saito et al., 1981).

Molgula retortiformis and *Ascidia callosa* are apparently the only species collected on this expedition that occur in both the North Pacific and North Atlantic (Van Name, 1945). *Chelyosoma productum*, *Corella inflata* and *C. willmeriana*, *Distaplia occidentalis*, *Pyura haustor* and *Styela truncata* have been recorded only from the NE Pacific. *Halocynthia hilgendorfi* is known from both the NW and NE Pacific.

Sixty-five species of ascidians are known to occur in Alaskan waters. Most of these were obtained by dredging many decades ago and may be restricted to the Bering Sea or the Arctic Ocean. The ascidian fauna of Alaska is still mostly unexplored, and probably there exist a number of undescribed species.

Publication of the present work, including a description of the new *Distaplia* species and redescription of the two *Ascidia* species, is in preparation with Dr. Karen Sanamyan of the Kamchatka Institute of Ecology.

References

- Huntsman, A.G. 1912. Ascidians from the coasts of Canada. Trans. Canad. Inst. 9: 111-148.
- Kott, P. 1985. The Australian Ascidiacea. Mem. Qd. Mus. 23: 1-440.
- Lambert, C.C. & G. Lambert 1998. Non-indigenous ascidians in southern California harbors and marinas. Mar. Biol. 130: 675-688.
- Lambert, G., C.C. Lambert & D.P. Abbott 1981. *Corella* species in the American Pacific Northwest: distinction of *C. inflata* Huntsman, 1912 from *C. willmeriana* Herdman, 1898 (Ascidiacea, Phlebobranchia). Can. J. Zool. 59: 1493-1504.
- Nishikawa, T. 1991. The ascidians of the Japan Sea. II. Publ. Seto Mar. Biol. Lab. 35: 25-170.

O'Clair, R.M. & C.E. O'Clair 1998. Southeast Alaska's Rocky Shores. . Plant Press, Auke Bay, AK, 564 pp.

Ritter, W.E. 1901. Papers from the Harriman Alaska Expedition. XXIII. The ascidians. Proc. Wash. Acad. Sci. 3: 225-266.

Ritter, W.E. 1913. The simple ascidians from the northeastern Pacific in the collection of the United States National Museum. Proc. U.S. Natl. Mus. 45: 427-505.

Saito, Y., H. Mukai & H. Watanabe 1981. Studies on Japanese compound styelid ascidians II. A new species of the genus *Botrylloides* and redescription of *B. violaceus* Oka. Publ. Seto Mar. Biol. Lab. 26: 357-368.

Sanamyan, K. 1993. Ascidians from the north-western Pacific region. 2. Molgulidae. Ophelia 38: 127-135.

Sanamyan, K. 1996. Ascidians from the north-western Pacific region. 3. Pyuridae. Ophelia 45: 199-210.

Van Name, W.G. 1945. The North and South American Ascidians. Bull. Amer. Mus. Nat. Hist. 84: 1-476.

Table 9C10.1 Sites visited:

1. Aug. 8 Homer Marina, Kachemak Bay, Cook Inlet

Salinity 27 ‰ 1 ft. depth, 30 ‰ at 2m depth; Temp. 10 ° C

Most of the following records are from suspended ropes.

Ascidia callosa--common esp. about halfway between the inner and outer ends of the marina.

Some contain brooded larvae in atrial chamber. Two small specimens from fouling panel: one from E1 and one from OH--2-P2.

Corella inflata--reported by John Chapman but not personally seen in spite of extensive sampling of floats and ropes. Samples lost; record not verified.

Distaplia new sp. very abundant at most locations in the marina, esp. on ropes 1-2 m. deep. A few small colonies on fouling panel.

Molgula retortiformis: 2 large and 8 small specimens on ropes. Two small specimens on fouling plate E1. The large animals contain brooded embryos in the atrial chamber.

Styela truncata - 1 small individual.

2. Aug. 9: Seward Marina.

Salinity 11 ‰ about a foot down.

Temperature 11.5 ° C.

No ascidians either at the marina or Lowell Pt. rocky intertidal (11 ‰, 11.5 ° C.)

3. Aug. 10, 1999 Whittier marina.

No sal. or temp. readings taken. Sal. very low; no ascidians on floats.

4. Aug. 10, 1999 Fairmont Bay oyster farm, Prince Wm. Sound.

Salinity 25 ‰ about a foot down.

Temperature 14 ° C.

Ascidia columbiana--numerous small specimens on concrete blocks of the fouling panels and one large one on bottom of submerged 4 ft long oyster bag.

5. Aug. 11, 1999 Valdez Marina

No salinity or temp. readings taken

No ascidians observed on marina floats or suspended ropes.

6. Aug. 11-12, 1999 Tatitlek

Salinity 27 ‰ about a foot down.

Temperature 17 ° C. surface

a) Fouling panels and frames, 3m depth:

Ascidia columbiana -- a few small specimens on the concrete blocks for the fouling panels and one on panel PL3-l.

Botrylloides violaceus -- numerous very small zooids on panels. Largest one with 2 zooids in colony. Youngest appeared to be only hours post metamorphosis.

Corella inflata -- common on both the panels and frames about 3m depth, with brooded larvae in the atrial chamber.

Table 9C10.1 (Continued) Sites visited:

b) Intertidal rocks, low tide, morning Aug. 12

Ascidia columbiana -- one large specimen coll. by J. Goddard.

Chelyosoma productum -- about 12 seen, 2 collected.

Halocynthia igaboja -- one very small immature specimen coll. by J. Goddard.

Pyura haustor -- 4 seen, one incomplete specimen collected. Difficult to collect; wedged tightly into rock crevices.

c) oyster cages from across bay: one small *Corella inflata*.

7. Aug. 13, 1999 Cordova Marina. Tide just beginning to come in.

Salinity 27 ‰ about a foot down.

Temperature 13 ° C. surface

Ascidia callosa-- numerous on floats and especially on suspended ropes. Some contain brooded larvae in atrial chamber.

Corella inflata -- large, common, full of brooded larvae in atrial chamber.

Distaplia new sp. --abundant colonies, with many mature larvae.

Distaplia occidentalis -- common; several color morphs, large heads, with mature larvae.

Styela truncata -- numerous. Some contain brooded larvae in atrial chamber.

b) Fouling panels

Ascidia callosa -- 12 small specimens from I dock, Pl. 3, 3 in a second vial.

Corella inflata -- one small specimen from I dock, Pl. 3; two in a second vial.

Corella willmeriana-- (specimens identified on site, not saved apparently.)

Distaplia new sp. -- numerous small colonies from I dock Pl. 3, one in a second vial.

Styela truncata -- 8 on fouling panels in voucher collection in one vial, 3 in another.

8. Aug. 14, 1999 Valdez fouling panels, Berth 5

Corella willmeriana -- 3 individuals, 1 large and 2 small. Specimens identified on site; not saved apparently.

Ascidia columbiana -- one small specimen from fouling panel (or perhaps the concrete block anchoring the panels) at 20 ft. (sampled 8/14).

Table 9C10.2 Ascidian vouchers from fouling panels 1998, identified Sept. 1999

Data taken from jar labels.

Homer 3/9/98 -- *Styela truncata* (1)

Homer: 9/3/98 -- *Ascidia callosa* (1)

Homer Oct. 1998 -- *Distaplia* new sp. collected by G. Sonnevil. Colonies without gonads or larvae.

Homer 5/11/99 -- *Distaplia* new sp. collected by G. Sonnevil. Colonies small, immature.

Chenega 7/9/98 -- *Corella inflata* (2) Port San Juan, Chenega sm. boat hbr

Chenega 9/7/98 -- *Ascidia callosa* (1)

Chenega no date -- *Corella inflata* (7) panel MI - 05 - ? (can't read label)

Valdez 9/8/98 -- *Corella inflata* (2) at Alyeska berths

No location given -- *Ascidia* sp. (1) too small to ID to species. Panel WH-04-P3.

Table 9C10.3 Systematics

Class Ascidiacea

Order Aplousobranchia

Family Holozoidae

Distaplia occidentalis Bancroft, 1899

Distaplia new species

Order Phlebobranchia

Family Corellidae

Chelyosoma productum Stimpson, 1864

Corella inflata Huntsman, 1912

Corella willmeriana Herdman, 1898

Family Ascidiidae

Ascidia callosa Stimpson, 1852

Ascidia columbiana (Huntsman, 1912)

Order Stolidobranchia

Family Styelidae

Botrylloides violaceus Oka, 1927

Styela truncata Ritter, 1901

Family Pyuridae

Halocynthia igaboja Oka, 1906

Pyura haustor (Stimpson, 1864)

Family Molgulidae

Molgula retortiformis Verrill, 1871

Table 9C10. 4 Ascidian References by Depth and Habitat

Depth(m)	Selected References
intertidal, floats;to 10m	Ritter '01, '13; VName 45; PWS Expedition 1999
us. 0-60m	Ritter'01,Huntsman'12,VName45,Abbott66,O'Clair98;PWS Exped. '99
0-few m.	Saito et al 81,Lambert & Lambert 98, PWS Exped. 1999
intertidal - 50m	Huntsman '12,VName 45,O'Clair98; PWS Exped. '99
0-50m	Huntsman '12,VName 45; PWS Exped. '99
0-few m.	Huntsman '12,VName 45; PWS Exped. '99
float	PWS Expedition 1999
floats; intertidal-few m.	VName 45, O'Clair 98, PWS Expedition 1999
to 57m	VName 45, Nishikawa 91,Sanamyan 96,O'Clair98, PWS Exped. '99
4-75m; floats	Ritter 01,VName 45,Abbott66,Sanamyan 93, PWS Exped. '99
intertidal - 114m	VName 45, Sanamyan 96,O'Clair98; PWS Exped. '99
ropes on floats;0-20m	Ritter '01, Van Name 45, PWS Exped. '99

Table 9C10.5 Ascidan Species Distribution in Alaska

Genus	Species	Author/date	Family	Distribution in Alaska
Ascidia	callosa	Stimpson, 1852	Asciidiidae	Homer;PWS:Fairmont Bay oyster farm,Tatitlek,Cordova,Valdez,Chenega
Ascidia	columbiana	(Huntsman, 1912)	Asciidiidae	Arctic coast to Alask. Penin. & SE Alaska
Botrylloides	violaceus	Oka, 1927	Styelidae	PWS: Tatitlek
Chelyosoma	productum	Stimpson, 1864	Corellidae	PWS: Tatitlek; Sitka Sound:Passage Is.
Corella	willmeriana	Herdman, 1898	Corellidae	PWS: Cordova, Valdez
Corella	inflata	Huntsman, 1912	Corellidae	PWS: Tatitlek, Cordova, Valdez, Chenega
Distaplia	new sp.		Holozoidae	Cook Inlet: Homer Marina; PWS: Cordova Marina
Distaplia	occidentalis	Bancroft, 1899	Holozoidae	PWS: Cordova Marina; Chichagof Is.
Halocynthia	igaboja	Oka, 1906	Pyuridae	Gulf of Alaska: Kodiak Is.;Chichagof Is.; PWS: Tatitlek; Prince Rupert BC
Molgula	retortiformis	Verrill, 1871	Molgulidae	SE Bering Sea to Sitka; Canoe Bay; SE Chukchi Sea; Homer Marina
Pyura	haustor	(Stimpson, 1864)	Pyuridae	Alaska Gulf:Sanak Is., Shumagin Is.; Sitka Sound:Alice Is.; PWS: Tatitlek
Styela	truncata	Ritter, 1901	Styelidae	Yakutat Bay; Cook Inlet: Homer Marina; PWS: Cordova Marina